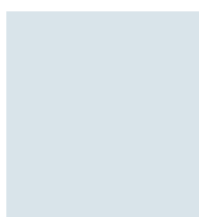


The Centre for Veterinary Epidemiology and Risk Analysis
The TB Diagnostics and Immunology Research Centre
The Badger Vaccine Project

Biennial Report, 2010-11



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S.J. More and D.M. Collins (editors)

H.K. More (illustrations)

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Preface

The Department of Agriculture, Food and the Marine (DAFM) provides ongoing financial support to three research units within the UCD School of Veterinary Medicine at University College Dublin:

- The Centre for Veterinary Epidemiology and Risk Analysis (CVERA);
- The TB Diagnostics and Immunology Research Centre; and
- The Badger Vaccine Project.

These units each work to support DAFM policy, inspectorate and laboratory staff in the area of animal health. The TB Diagnostics and Immunology Research Centre and the Badger Vaccine Project focus on bovine tuberculosis research. CVERA is a national resource centre, providing policy advice and conducting epidemiological research on a wide range of animal health issues. In addition, CVERA provides general support to government, industry and the veterinary profession (pre- and post-graduation).

This report documents work conducted by, or in association with, these three UCD-based research units during 2010 and 2011.

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Acknowledgements

The Centre for Veterinary Epidemiology and Risk Analysis

CVERA works closely with colleagues from a wide range of organisations, both in Ireland and internationally, and their input is gratefully acknowledged. Staff from each of the following organisations were co-authors, with CVERA staff, of international peer-reviewed scientific papers published during 2010-11.

University College Dublin

- UCD College of Agriculture, Food Science and Veterinary Medicine
- UCD Institute for Food and Health
- UCD School of Applied Social Science
- UCD Geary Institute
- UCD School of Mathematical Sciences
- UCD School of Public Health, Physiotherapy and Population Science

Rest of the Republic of Ireland

- Animal Health Ireland
- Cork County Council
- Department of Agriculture, Food and the Marine (DAFM)
- DAFM Veterinary Laboratory Service
- Emlagh Lodge Veterinary Centre
- Enfer Scientific
- MSD Animal Health
- Private practitioners and consultants
- TCD School of Natural Sciences
- Teagasc
- The Irish Cattle Breeding Federation
- UCC School of Biological, Earth and Environmental Sciences

United Kingdom

- Institute of Biological, Environmental and Rural Sciences, Aberystwyth University, Aberystwyth, Wales
- Institute of Evolutionary Biology, University of Edinburgh, Edinburgh, Scotland
- Institute of Life Sciences, School of Medicine, Swansea University, Swansea, Wales
- Peter Gorer Department of Immunobiology, Kings College London, London, England
- School of Biological Sciences, University of Edinburgh, Edinburgh, Scotland
- Scottish Agricultural College, Edinburgh and Midlothian, Scotland
- The Roslin Institute, Midlothian, Scotland
- Veterinary Epidemiology and Economics, Hertfordshire, England
- The Royal Veterinary College, England
- Veterinary Laboratories Agency, Weybridge, England

Rest of World

- Department of Large Animal Sciences, The Royal Veterinary and Agricultural University, Frederiksberg C, Denmark
- Department of Medicine, Mount Sinai School of Medicine, New York, U.S.A.
- Department of Population Medicine, University of Guelph, Ontario, Canada
- Food Safety and Sanitation Division, Ministry for Food, Agriculture, Forestry and Fisheries, Republic of Korea
- National Veterinary Research and Quarantine Service, Republic of Korea
- Wageningen University, Wageningen, The Netherlands

The TB Diagnostics and Immunology Research Centre

Staff from the centre acknowledge the help and support of District Veterinary Office (DVO) staff in providing samples for the IFN- γ test.

The Badger Vaccine Project

Staff working on the Badger Vaccine Project acknowledge the contribution and support of Kevin Kenny, Frances Quigley and colleagues at the mycobacteriology laboratory (DAFM Veterinary Laboratory Service, Backweston, Celbridge, Co. Kildare, Ireland), and Paddy Sleeman of University College Cork for fieldcraft. Glyn Hewinson, Mark Chambers, Sandrine Lesellier, and staff at the Animal Health Veterinary Laboratories Agency (AHVLA, UK) are also thanked for developing and carrying out many of the immunoassays used in the badger vaccine studies, and for contributing technical expertise and advice for the research programme.

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Further information

In this report, projects are either:

- *Complete*, which includes those projects where relevant peer-reviewed papers, or equivalent, have been published in 2010/11, or
- *Current*, which includes the balance of active projects covering the spectrum from an advanced research concept through to final write-up.

Manuscript preparation is conducted in accordance with Uniform Requirements for Manuscripts Submitted to Biomedical Journals of the International Committee of Medical Journal Editors (previously the Vancouver Group). For further information, see www.icmje.org. Guidelines for the transparent reporting of specific study types (for example, the CONSORT statement for transparent reporting of trials, www.consort-statement.org) are followed.

An up-to-date list of all peer-review papers produced by, or in association with, the Centre for Veterinary Epidemiology and Risk Analysis, the TB Diagnostics and Immunology Research Centre and the Badger Vaccine Project is available at www.ucd.ie/cvera.

Affiliated staff members

The Centre for Veterinary Epidemiology and Risk Analysis

Board of management

- Simon J. More (UCD)

School, College and University representatives

- University VP for Research
- Principal, UCD College of Agriculture, Food Science and Veterinary Medicine
- Head of UCD School of Veterinary Medicine
- Professor Michael Doherty, UCD School of Veterinary Medicine

From the Department of Agriculture, Food and the Marine

- State Veterinary Service:
 - Martin Blake
 - Michael Sheridan
 - Margaret Good
- Veterinary Laboratory Service
 - Dónal Sammin
- DAFM policy
 - Philip Carroll

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 Guy McGrath (UCD)
 Isabella Higgins (UCD)

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The Badger Vaccine Project

Eamonn Gormley Elvira Ramovic
 Leigh Corner Marian Teeling
 Marion Barrett Anthony Duignan (DAFM)
 Denise Murphy Eamon Costello (DAFM Veterinary Laboratory Service)

Overview

The Centre for Veterinary Epidemiology and Risk Analysis

The UCD Centre for Veterinary Epidemiology and Risk Analysis (UCD CVERA) is the national resource centre for veterinary epidemiology in Ireland, located within the UCD School of Veterinary Medicine at University College Dublin. The Centre was initially established as the Tuberculosis Investigation Unit, but in recent years has broadened its remit to cover a wide range of international, national and local animal health matters, including:

- Epidemiological support for the control and eradication of regulatory animal diseases, which includes national programmes for bovine tuberculosis, bovine brucellosis and bovine spongiform encephalopathy;
- Work in support of Animal Health Ireland (www.animalhealthireland.ie), which is providing a proactive, coordinated and industry-led approach in Ireland to non-regulatory animal health concerns (such as mastitis, fertility and infectious bovine rhinotracheitis); and
- Epidemiological support for a broad range of other animal health and welfare issues relating to emergency animal disease preparedness and response (for example, avian influenza, bluetongue and equine infectious anaemia), on-farm investigations, welfare of farmed livestock and horses, health of companion animals and farmed fish, and international collaboration.

UCD CVERA staff work closely with national policy-makers, both in government and industry. Staff also contribute to training in veterinary medicine, both to undergraduates and postgraduate. A broad range of expertise is represented within the Centre, including agriculture and animal sciences, database development and management, geographic information systems, statistics, veterinary medicine and epidemiology. The Centre is staffed by employees of University College Dublin and of the Department of Agriculture, Food and the Marine (DAFM).

The Badger Vaccine Project

The badger vaccine project is a programme of research with the objective to develop a vaccine to control tuberculosis in badgers and to break the link of infection to cattle. In studies with captive badgers, we have demonstrated that vaccination of badgers with BCG by a number of routes, including oral delivery, generates high levels of protective immunity against challenge with *M. bovis*. We are continuing to carry out studies with captive population of badgers to refine the vaccine and address issues relating to the eventual licensing of the vaccine as a veterinary medicine. We are also evaluating diagnostic tests with colleagues at AHVLA (Weybridge UK). A field trial commenced in 2009 to test the efficacy of the oral BCG vaccine in free-living badgers over a wide geographic area in Co. Kilkenny. The vaccination phase of the field trial will be completed in 2012, followed by detail analysis of the results. It is hoped that the data and experience generated during the field trial will lead to implementation of a vaccination strategy within the national control programme.

TB Diagnostics and Immunology Research Centre

The gamma-interferon (IFN- γ) assay is used as a tool to assist in the eradication of bovine tuberculosis from the national cattle herd. All of the testing is carried out in the laboratory based at UCD. In the period 2010-2011, 13,662 blood samples were submitted to the laboratory for testing. The majority of samples originated from bovine reactor re-test herds, where the test was used to identify infected animals that were missed by the skin test. Other strategic uses of the test were targeted at inconclusive reactor re-tests and confirmation of the exposure status of skin test positive animals. The number of samples submitted was fewer than in 2008-2009 (28,000 samples); this was partly due to the reduced number of infected animals in the recent years. In addition, the focus of testing was targeted at the highest at-risk exposed cohorts of animals, based on epidemiological investigation. This resulted in identification of a higher proportion of IFN- γ positive animals among the samples submitted for testing. In 2008-2009, 26% of samples submitted were positive to the IFN- γ test. In 2010-2011 this increased to 33%, demonstrating a more efficient and cost-effective usage of the test. The laboratory continues to conduct research with a view to improving the performance of the assay under Irish conditions. Recent studies have investigated the performance, in Irish cattle, of an improved assay platform developed by Prionics Ltd. Results of this analysis are expected in 2012.



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